

CLAIMS:

1-12. (cancelled)

13. (Currently amended) A ~~single-electron-tunneling~~ transistor, comprising three conductive segments of DNA molecules connected to an active core grain, wherein the active core grain ~~consists of~~ comprises a fourth bare DNA segment

wherein a pair of said three conductive segments are linked to said active core via P-bridges, wherein a third of said conductive segments is capacitively linked to said active core via H-bonds, and wherein said third segment is configured to electrically modulate current flowing across said active core through said P-bridges between said pair of conductive segments in response to a gate voltage applied to said third conductive segment.

14. (currently amended) The ~~single-electron-tunneling~~ transistor of claim 13, wherein the conductive segments ~~parts~~ of DNA molecules are M-DNA conductive strands.

15. (currently amended) The ~~single-electron-tunneling~~ transistor of claim 13, wherein the conductive

segments ~~parts~~ of DNA molecules are Poly-G Poly-C DNA
conductive strands.

16. (currently amended) The ~~single-electron tunneling~~
transistor of claim 13, wherein ~~the single-electron~~
~~tunneling transistors employ~~ a hopping mechanism
across a tunnel junction is employed for electron
transferring between ~~said DNA-based conductive~~
~~elements,~~ the pair of conductive segments and said
active core as a tunnel junction for a net charge.
17. (currently amended) The ~~single-electron tunneling~~
transistor of claim 16, wherein said hopping mechanism
~~comprising~~ comprises using a P-bridge as the tunnel
junction. ~~for a net charge.~~

18-29 (cancelled).

30. (new) A DNA-based electronic device, comprising:

a length of a DNA molecule; and

a gate structure disposed adjacent to the length
of the DNA molecule;

wherein the gate structure is capacitively coupled to the
length of the DNA molecule, whereby electric charge in the

length of the DNA molecule can be controlled by application of a voltage or current to the gate structure.

31. (new) The electronic device of claim 30 wherein the length of the DNA molecule comprises one strand of the pair of complementary strands defining the DNA molecule structure.

32. (new) The electronic device of claim 30 wherein the length of the DNA molecule comprises a double strand DNA molecule segment.

33. (new) The electronic device of claim 30, wherein the electric charge in the length of the DNA molecule is provided via source and drain contacts that are disposed on the length of the DNA molecule.

34. (new) The electronic device of claim 30, wherein the source and drain contacts comprise a complex of metal ions and DNA molecules (M-DNA).

35. (new) The electronic device of claim 30, wherein the source and drain contacts comprise Poly-G Poly-C type DNA materials.

36. (new) The electronic device of claim 30 which is further disposed in an electronic logic circuit.